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(71) 出願人 000006895  
 矢崎総業株式会社  
 東京都港区三田1丁目4番28号  
 (72) 発明者 杉浦 万寿夫  
 静岡県裾野市御宿1500 矢崎総業株式会社  
 内  
 (72) 発明者 濱口 弘樹  
 静岡県裾野市御宿1500 矢崎総業株式会社  
 内  
 (74) 代理人 100083806  
 弁理士 三好 秀和 (外8名)

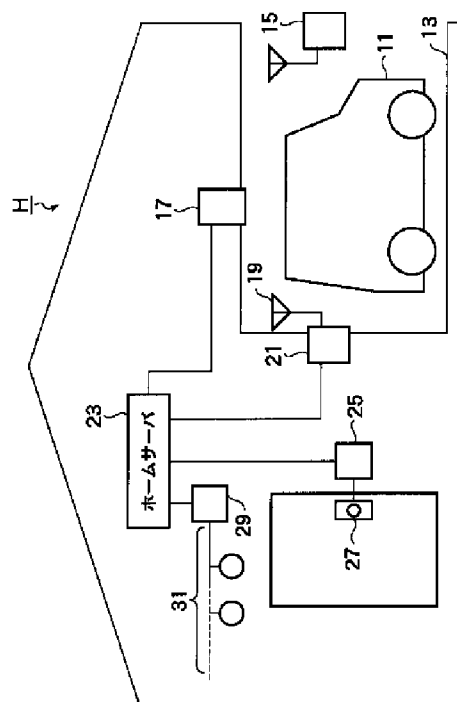
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(54) 【発明の名称】 ホームオートメーション方法、及びその装置

## (57) 【要約】

【課題】 ホームへの車両の帰還を監視し、この監視の結果、車両がホームへ帰還したことが検出されたときには、ユーザがとるであろう定型的な動作を自動的に代行して行おうとするホームオートメーション方法、及びその装置を提供することを目的とする。

【解決手段】 ホームHには車両11のための車庫13が備えられている。車両が車庫に入ると車両検出装置17がこれを検出しホームサーバ23に伝える。さらにドライバがキーレス送信器15のドアロックスイッチを押して車両のドアをロックすると、送信装置15の電波を送信信号検出装置21が検出して、所定の自車IDと照合する。その結果、自車の帰還であることが確認されると、ホームサーバ23が玄関錠制御装置25に指令を発して玄関ドア錠27を自動的に解錠する。



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- 3.In the drawings, any words are not translated.

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## DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the home automation method based on a new idea of associating homes, such as a house, and vehicles, such as a car, and carrying out the automatic control of the controlled object by the side of a home, and its device.

[0002]

[Description of the Prior Art]Carry out the automatic control of the various equipment, such as an air-conditioner installed in homes, such as a house, by computer in recent years, or, Home automation which notifies an external security company automatically according to the detection result by sensors, such as a door opening closed sensor installed in every place in a home, gains popularity.

[0003]On the other hand, vehicles, such as a car beyond one set or it, have come to spread through the family widely at each home.

[0004]

[Problem(s) to be Solved by the Invention]However, the actual condition is that associate a home and vehicles and the home automation based on a new idea of carrying out the automatic control of the controlled object by the side of a home does not yet exist.

[0005]If this invention persons state here the circumstances of having come to think out the home automation based on such a new idea, when vehicles return to a home, generally it can be said that the action which human being takes is quite finite. For example, if the action which those who finished work in an office and went home by car take is assumed, first, vehicle warehousing of the vehicles is carried out in a car barn, the door of vehicles is locked, and he closes the shutter of a car barn, walks to the door, and the key of the door of the door is unlocked, and a porch light will be turned on if it is night. And what will be acted [ switching on an electric pot, in order to drink the tea into which the switch of TV which makes an air-

conditioner one is put, if it goes indoors, heating a bath, etc. and ] finitely can be guessed easily.

[0006]Thus, in spite of expecting including a quite finite element, the action of the user [ after vehicles return ], When it is always awaiting and vehicles return if compelled, that vehicles return, The home automation of having associated the home and vehicles of the meaning which execute by proxy these finite operations that the user will perform automatically, and carrying out the automatic control of the controlled object by the side of a home did not yet exist once.

[0007]When this invention is based on the new idea mentioned above, and supervises the return of the vehicles to a home and it is detected as a result of this surveillance that vehicles returned to the home, Let it be a technical problem to provide the home automation method of executing by proxy finite operation which the user will take automatically, and trying to perform it, and its device.

[0008]Other technical problems of this invention are the stages in which the vehicles before vehicles arrive at a home approached the home, Because it is made to control the controlled object attached to the home side, i.e., start control of operation of a controlled object beforehand in advance of arrival of vehicles. It is in providing the home automation method which can be secured to the state where the purpose of the controlled object concerned was already attained about a general controlled object which has a time lag by purpose achievement at the arrival time of actual vehicles, and its device.

[0009]

[Means for Solving the Problem]In order to solve an aforementioned problem, a home automation method of this invention concerning claim 1 is characterized by controlling a controlled object attached to this home side, when a return of vehicles to a home is supervised and a return to said home of said vehicles is detected as a result of this surveillance.

[0010]When according to a method according to claim 1 a return of vehicles to a home is supervised and it is detected as a result of this surveillance that vehicles returned to a home, A home automation method based on a new idea of executing by proxy finite operation which a user will take automatically, and performing it and that convenience is very high can be provided.

[0011]Here, in a statement of claim 1, a home is a large concept which also includes bases, such as buildings, such as an office and a factory, and a delivery center, not to mention residences, such as an individual house and an apartment. Therefore, kinds of controlled object attached differ according to a kind of home, and the control contents differ. For example, it can become control of a controlled object attached to the home side to make preparations which select a car-barn space only for a user automatically, and can park it immediately, if it is the apartment provided with a multistage type motor pool of a robot type, or to start a personal

computer only for oneself, if a home is an office. If vehicles are tracks and a home is a delivery center, it can also become control of a controlled object here to call an automatically carry robot in a delivery center, and to take out a cargo of a track automatically. Of course, if a home is a general home, control of a car barn and electrical household appliances and electrical equipment which were mentioned above can turn into control of a controlled object.

[0012]In a home automation method according to claim 1, in order to supervise and detect a return of vehicles to a home, various art is available. For example, a feeble radio wave sender which sends a specific signal to vehicles is carried, and a return can be detected with having received a specific signal which requires a receiver by the side of a home. A road facing a home can be supervised with a CCD camera, a number of a number plate can be decoded by image processing, and a return can also be detected by a number of a user's vehicles having been detected. When a navigation device carried in vehicles shows coordinates of a home, taking means which emit a return notification signal from the vehicles side to the home side can also be realized. however, carry out for taking which means -- it cannot be overemphasized that it is requested that a monitor method which does not malfunction depending on passing of vehicles other than a self-vehicle is chosen.

[0013]Then, a home automation method according to claim 2 is characterized by performing detection of a return to said home of said vehicles based on existence of vehicles in a car barn attached to this home.

[0014]According to a method according to claim 2, a return of vehicles can be detected very easily by whether vehicles are in a car barn only for the self-vehicle attached to a home, or there is nothing, and since it is a car barn only for a self-vehicle, there is also no possibility of wrong detection.

[0015]A home automation method according to claim 3, In a home automation method according to claim 2, when a sending signal from a keyless entry device of said vehicles is detected after a return to said home of said vehicles was detected, it is characterized by controlling a controlled object attached to said home side.

[0016]According to a method according to claim 3, after vehicles enter in a car barn, when a user (driver) does door-lock operation using a remote control transmitter of a keyless entry device, a controlled object by the side of a home is controlled. Since a subsequent control action is not started with vehicles having only entered in a car barn but a sending signal (door-lock signal) of a keyless entry device is detected as a step of a check so to speak, generating of malfunction can be prevented certainly. And the user should just do door-lock operation usually performed at the time of alighting.

[0017]A home automation method according to claim 4 is characterized by performing detection of a return to said home of said vehicles based on a sending signal from a keyless entry device of said vehicles having been detected in a home automation method according to

claim 1.

[0018]Since attestation that an ID code is contained in a sending signal from a keyless entry device of vehicles, and it is a self-vehicle is ensured according to a method according to claim 4, even if it carries out only with detection of this signal, detection of a return of a self-vehicle can be ensured. And only door-lock operation inevitably performed at the time of alighting is required of a user.

[0019]A home automation method according to claim 5, In a home automation method according to claim 1, detection of a return to said home of said vehicles is characterized by being carried out based on multiple-times detection of the sending signal from a keyless entry device of said vehicles having been carried out into predetermined time.

[0020]In a method according to claim 5, a user operates a keyless entry device at the time of alighting, for example, he pushes a door-lock switch twice in succession [ a user ]. Since operation of pushing a door-lock switch twice in succession is not usually performed, it would have this peculiarity, and mere door-lock operation would not be performed, but it will be reported clearly that vehicles returned to a home.

[0021]And claim 4 or among 5, in a home automation method given in any 1 paragraph, a home automation method according to claim 6 is characterized by controlling a controlled object attached to said home side, when a return to said home of said vehicles is detected.

[0022]That is, when a return of vehicles is certainly detected by a method given in any 1 paragraph claim 4 or among 5, control of a controlled object by the side of a home is started.

[0023]Thus, the method according to claim 1 to 6 can control various controlled objects according to a kind of home, or a kind of attached structure.

[0024]However, it is significant to specify a desirable mode among controlled objects provided in the home side, when clarifying an outline of this invention.

[0025]From such a viewpoint, a home automation method according to claim 7, In a home automation method given in any 1 paragraph, it is characterized by control of a controlled object attached to said home side being control of unlock operation of a door lock of the door of said home among claims 1 thru/or 6.

[0026]It decided to control unlocking of a door lock of the door after a return assumed to be the most typical fixed form operation by a method according to claim 7.

[0027]According to the invention of claim 7, unlocking control of a door lock of the door is made after a return of vehicles to a home, but. While a situation where a user did not enter into a home immediately after a return of vehicles to a home was also assumed and unlocking of a door lock of the door was made in such a case, it is not desirable from a viewpoint on crime prevention.

[0028]Then, a home automation method according to claim 8, In a home automation method according to claim 7, when operation of opening a door of the door in predetermined time is

not detected after performing unlock operation of a door lock of said door, it is characterized by returning said door lock to a locked state.

[0029]Even when you have gone out as it is after a return of vehicles according to a method according to claim 8, without a user going into a home immediately, it does not become [ open / continue / a door lock of the door ]. Even if it is a case where a door lock of the door has been automatically unlocked by wrong detection, it should return to a locked state automatically after predetermined time. Therefore, it is thoroughgoing also from a viewpoint on crime prevention.

[0030]On the other hand, the home automation device according to claim 9 is characterized by having a monitor means which supervises a return of vehicles to a home, and a control means which controls a controlled object attached to said home side when the monitor means detects a return to said home of said vehicles, and being constituted.

[0031]According to the device according to claim 9, a return of vehicles to a home is supervised, and when it is detected as a result of this surveillance that vehicles returned to a home, finite operation which a user will take can be executed by proxy automatically, and can be performed. And such home automation operation, A home automation system with very high flexibility independent of a type of a car and composition of vehicles can be built as a result whose realization is attained only by carrying out additional maintenance of the composition by the side of a home newly, without also giving any change, maintaining composition by the side of vehicles in the conventional state.

[0032]The home automation device according to claim 10 is characterized by said monitor means comprising a vehicle detecting means which detects existence of vehicles in a car barn attached to said home in the home automation device according to claim 9.

[0033]According to the device according to claim 10, since a return of vehicles can be detected very easily by whether vehicles are in a car barn only for the self-vehicle attached to a home, or there is nothing, composition becomes easy as much as possible. If it is a car barn only for a self-vehicle, there will also be no possibility of wrong detection by other vehicles.

[0034]A home automation method according to claim 11, In the home automation device according to claim 10, said control means, Have a sending-signal detection means to detect a sending signal from a keyless entry device of said vehicles, and the control means, When said sending signal is detected by said sending-signal detection means after a return to said home of said vehicles was detected, it is characterized by controlling a controlled object attached to said home side.

[0035]Since according to the device according to claim 11 a subsequent control action is not started with vehicles having only entered in a car barn but a sending signal (door-lock signal) of a keyless entry device is detected as a step of a check so to speak, generating of malfunction can be prevented certainly. And the user should just do door-lock operation

usually performed at the time of alighting.

[0036]The home automation device according to claim 12, In the home automation device according to claim 9, said control means, It has a sending-signal detection means to detect a sending signal from a keyless entry device of said vehicles, and the control means is characterized by controlling a controlled object attached to said home side, when a sending signal from a keyless entry device of said vehicles is detected.

[0037]Since attestation that an ID code is contained in a sending signal from a keyless entry device of vehicles, and it is a self-vehicle is ensured according to the device according to claim 12, even if it carries out only with detection of this signal, detection of a return of a self-vehicle can be ensured. And only door-lock operation inevitably performed at the time of alighting is required of a user.

[0038]The home automation device according to claim 13, In the home automation device according to claim 9, said control means, It has a sending-signal detection means to detect a sending signal from a keyless entry device of said vehicles, and is characterized by the control means controlling a controlled object attached to said home side, when multiple-times detection of the sending signal from a keyless entry device of said vehicles is carried out into predetermined time.

[0039]In the device according to claim 13, a user operates a keyless entry device at the time of alighting, for example, he pushes a door-lock switch twice in succession [ a user ]. Since operation of pushing a door-lock switch twice in succession is not usually performed, it would have this peculiarity, and mere door-lock operation would not be performed, but it will be reported clearly that vehicles returned to a home.

[0040]The device according to claim 9 to 13 can control various controlled objects according to a kind of home, or a kind of attachment equipment.

[0041]However, the home automation device according to claim 14 is characterized by control of a controlled object attached to said home side being control of unlock operation of a door lock of the door of said home in a home automation device given in any 1 paragraph among claims 9 thru/or 13.

[0042]It decided to control unlocking of a door lock of the door after a return assumed to be the most typical fixed form operation by the device according to claim 14.

[0043]The home automation device according to claim 15, In the home automation device according to claim 14, said control means, a time check started after performing unlock operation of a door lock of said door -- having a means -- the control means -- said time check -- a time check of predetermined time by a means -- when operation of opening a door of the door in front is not detected, it is characterized by returning said door lock to a locked state.

[0044]Even when you have gone out as it is according to the device according to claim 15, without a user's doing vehicle warehousing of the car and going into a home after a return of

vehicles, it does not become [ open / continue / a door lock of the door ]. Even if it is a case where a door lock of the door has been automatically unlocked by wrong detection, it should return to a locked state automatically after predetermined time. Therefore, it is thoroughgoing also from a viewpoint on crime prevention.

[0045]Each methods according to claim 1 to 15 or devices supervise a return of vehicles to a home, and when it is detected as a result of this surveillance that vehicles returned to a home, finite operation which a user will take is executed by proxy automatically, and is performed. However, when converting the way of thinking, and a start of vehicles from a home is supervised and it is detected as a result of this surveillance that vehicles departed from a home, home automation which executes by proxy operation with a possibility that a user may fail to do, automatically, and performs it is also possible. When are thought with this directivity and a door lock of the door remains unlocking, for example although a start was detected, this can be locked automatically.

[0046]Then, a home automation method according to claim 16 is characterized by controlling a controlled object attached to this home side, when a start of vehicles from a home is supervised and a start from said home of said vehicles is detected as a result of this surveillance.

[0047]When according to a method of claim 16 a start of vehicles from a home is supervised and it is detected as a result of this surveillance that vehicles departed from a home, A home automation method based on a new idea of executing automatically by proxy finite operation with a possibility that a user may fail to do, and performing it and that convenience is very high can be provided.

[0048]The home automation device according to claim 17, It is characterized by having a monitor means which supervises a start of vehicles from a home, and a control means which controls a controlled object attached to said home side when the monitor means detects a start from said home of said vehicles, and being constituted.

[0049]According to the device according to claim 17, a start of vehicles from a home is supervised, and when it is detected as a result of this surveillance that vehicles departed from a home, finite operation with a possibility that a user may fail to do can be executed by proxy automatically, and can be performed. And such home automation operation, A home automation system with very high flexibility independent of a type of a car and composition of vehicles can be built as a result whose realization is attained only by carrying out additional maintenance of the composition by the side of a home newly, without also giving any change, maintaining composition by the side of vehicles in the conventional state.

[0050]In a home automation method and a device which were indicated to claims 1 thru/or 15, when a return of vehicles to a home is supervised and vehicles return to a home, finite operation which a user will take is executed by proxy automatically, and it is made to perform



it. However, there is a thing it is more desirable to have preceded rather than vehicles returned to a home actually depending on a kind of controlled object, and to start operation. For example, with a method and a device which were indicated to claims 1 thru/or 15, although it is very convenient to start an air-conditioner automatically when a driver goes home, If it takes into consideration needing some time after starting an air-conditioner before indoor air is cooled and an air-conditioner is able to be partly started beforehand rather than actually going home, when it goes home, indoor air is already cooled fully and it is comfortable.

[0051]Then, in 18 or less claim, vehicles before vehicles arrive at a home are the stages close to a home, and were made to control a controlled object attached to the home side.

[0052]That is, a home automation method according to claim 18 supervises approach at a home of vehicles, and when it is detected that said vehicles approached even into a predetermined region which includes said home as a result of this surveillance, it is characterized by controlling a controlled object attached to this home side.

[0053]In a method according to claim 18, since a controlled object attached to the home side is controlled by a stage in which former vehicles approached a home rather than vehicles arrive at a home, if it is in a controlled object by the side of a home, it becomes possible to perform a priori operation of contents with which arrival of vehicles was equipped.

[0054]According to a method according to claim 18, a room temperature can be made into optimal temperature by arrival time to a home of vehicles by foreseeing that vehicles arrive at a home and for example, making it start from arrival beforehand about an indoor air-conditioner of a home before. And it is this effect's not being restricted to an air-conditioner, being applied about a general controlled object which has a time lag by purpose achievement, making it precede with arrival of vehicles, and controlling operation of a controlled object beforehand, It can change into the state where the purpose of the controlled object concerned was attained in an arrival time point of actual vehicles.

[0055]In a method according to claim 18, it is possible for surveillance of approach at a home of vehicles to adopt various means. For example, if it is in vehicles equipped with radio transmitters, and field intensity of a radio wave sent from vehicles is measured to the home side, a rough distance of even vehicles can be known. Thus, the invention according to claim 18 is enough to attain the purpose of the invention concerned once if it is roughly detectable that vehicles approached a home, Although detection of a strict distance whether it is [ 570-m ] whether distance of vehicles and a home is 550 m does not eliminate this, it is not necessarily required.

[0056]And a home automation method according to claim 19 is characterized by performing detection of approach at said home of said vehicles by a vehicle station detecting means carried in said vehicles in a home automation method according to claim 18.

[0057]In a method according to claim 19, a vehicle station detecting means in which it was

carried by vehicles is made to perform approach at a home of vehicles. As a vehicle station detecting means, the existing car-navigation system carrying GPS or a gyroscope can be diverted here. In the industry more specifically provided with a vehicle position detection system which can grasp a current position of each vehicles in real time in a control center as a home like a bus or a taxicab industry. Such an existing system is diverted and it becomes possible to call a priori a driver who succeeds the vehicles and operates, and to make him stand by supposing homecoming time of a specific vehicle etc. When applying a method of this claim to a private vehicle of individual possession, it is good to equip vehicles with a means of communication which notifies a vehicle position detected by a vehicle station detecting means to the home side.

[0058]Since a vehicle station detecting means detects a current position of vehicles according to a method according to claim 19, it can be grasped correctly to which distance vehicles approached a home. As mentioned above, in an invention of an 18 or less-claim statement, strict range measurement how many meters or how many kilometers distance of vehicles and a home is cannot be carried out, but \*\* can also attain the purpose of an invention once. However, the same effect as the invention according to claim 18 can be acquired in low cost, without adding special equipment, if this is diverted when a vehicle station detecting means is already carried in vehicles.

[0059]A home automation method according to claim 20 is characterized by said predetermined region's having a radius of distance which a user set up beforehand, and appointing it as a field of an approximate circle form centering on said home in a home automation method according to claim 18 or 19.

[0060]In a method according to claim 20, when vehicles invaded into a range within a predetermined distance (for example, 2 km) from a home, it detected that vehicles approached a home. And it can be set up arbitrarily whether only how much time is preceded from the actual arrival time, and control of a controlled object is made to start by a user enabling it to set up this distance. If time length to precede is given like wanting 15 quotas to start control of a controlled object from arrival, distance which should be roughly set up with an experience value will be able to be known. Even if time length to precede is the same, when a home is located in the center of Tokyo in a chronic congested state, set distance is shortened, and when there is a home in a suburb, what sets up for a long time may be needed. Combining a providing system (VICS) etc. of congestion information which is spreading now, during traffic congestion, it may constitute shortening set distance etc. so that set distance may be dynamically changed according to a degree of traffic congestion. Since time length which is demanded with character of a controlled object and which should be preceded differs, it may enable it to set up a different distance for every controlled object.

[0061]According to a method according to claim 20, since the user can set up whether a

desired distance is only inputted, only how much time is preceded from the actual arrival time, and control of a controlled object is made to start, his setting operation is very simple. If a user who runs the same road as the time every day almost same especially for commutation etc., and goes home has, Since it requires that the back starts till arrival as it is experientially sudden if even how many kilometers or what 100 m are approached from a home, it is simple and realistic to set up time length substantially preceded with arrival by the input of distance. The setting out of distance can extend an application range further, if setting out of plurality is enabled for every controlled object.

[0062]Although it is directly [ claim 20 ] unrelated, in vehicles carrying a car-navigation system provided with a function which can compute estimated time of arrival, this function is effectively utilized by giving a current position and an objective position of vehicles, Time length precede before arrival for 30 minutes and make control of a controlled object start and which is directly preceded with how can also be inputted.

[0063]On the other hand, a home automation method according to claim 21, Said vehicle station detecting means is provided with a displaying means which displays a map including a field said vehicles run in a home automation method according to claim 19, and said predetermined region, It is characterized by what is defined because a user sets up arbitrary fields on a map displayed on a displaying means of said vehicle station detecting means.

[0064]When vehicles carrying a car navigation device were assumed, fields arbitrary on a display screen of this device were set up and it invaded in the field, it was made to consider that vehicles approached a home in a method according to claim 21.

[0065]Since a field judged to be approach of vehicles can be set up in detail according to a method according to claim 21, an application range can be extended further. For example, when going home at a home and roads via which it goes by the day running a local street and returning [ run a highway, return, or ] differ. If it is made to set it as short distance from a home about a field including a running path of a local street while setting it as a long distance from a home about a field including a highway, Without asking any running paths are, only the same time can be preceded and control of a controlled object can be made to start rather than arrival substantially now. When there is a supermarket at which it drops in frequently in the middle of going home, what prevents it from a controlled object preceding in time more than needed, and being controlled by setting up a field not include the supermarket in shopping in consideration of taking time can be performed.

[0066]A home automation method according to claim 22, In a home automation method of claim 18 thru/or 21 given in any 1 paragraph, it is characterized by control of a controlled object attached to said home side being control of operation of a cooler machine of said home, and/or a space heating appliance.

[0067]In a method according to claim 22, we decided to make air-conditioning equipment of a

home of a going-home place into a controlled object. If it is in summer or a winter season, although it gets hot according to outside air temperature or gets cold, if room temperature of a home (it does not limit to an ordinary home) made air-conditioning equipment one after a driver went home, during absence, it will need the appropriate time required, by the time the interior of a room reaches comfort temperature.

[0068]Since air-conditioning equipment of a home is controlled by a stage in which vehicles approached a home before time when vehicles arrive at a home according to a method according to claim 22, when a driver goes home, a room temperature of a home can be changed into a comfortable state.

[0069]On the other hand, the home automation according to claim 23 is characterized by control of a controlled object attached to said home side being control of operation of autobus of said home in a home automation method of claim 18 thru/or 21 given in any 1 paragraph.

[0070]In a method according to claim 23, we decided to make a bath (autobus) of a home of a going-home place into a controlled object. When a driver goes home by this, it becomes possible to change into the state where a bath is automatically ready.

[0071]Since according to a method according to claim 23 it will be ready for the ability to take a bath in a bath immediately when a driver goes home at a home, a living environment convenient especially for an unmarried person can be provided.

[0072]A home automation method according to claim 24, In a home automation method of claim 18 thru/or 21 given in any 1 paragraph, Said home is a cargo facility for the purpose of transportation thru/or delivery of cargo, and said vehicles are characterized by control of a controlled object attached to said home side being control of operation of a device which prepares beforehand cargo loaded to said vehicles in said cargo facility.

[0073]In a method according to claim 24, we decided to make into a controlled object a device which prepares beforehand cargo loaded to vehicles in a cargo facility as a home supposing vehicles for transportation of cargo thru/or delivery.

[0074]According to a method according to claim 24, like a department store, merchandise delivery of a mail order, and the door-to-door delivery industry, In the industry loads cargo for [ whenever it arrives at a cargo facility ] delivery into vehicles, finishes loading, departs from a cargo facility immediately gradually, and it runs to the next destination, Before time when vehicles arrive at a cargo facility, in a stage in which vehicles approached a cargo facility. Since preparation of the following cargo which should be loaded into vehicles which arrive by the cargo facility side can be made, time which loading of cargo takes as much as possible can be shortened, and operational efficiency of vehicles can be raised. Therefore, it also becomes [ not only according to needs that shortening of transport time like next-day delivery and delivery time specification which are generalized in recent years is required, but ] realizable by raising operational efficiency of vehicles to reduce the total number of required vehicles.

[0075]In 25 or less claim, a device for performing a method indicated to said claims 18 thru/or 24 is indicated.

[0076]Namely, the home automation device according to claim 25, It is characterized by having an approach detection means which detects approach of vehicles at a home, and a control means which controls a controlled object attached to said home side when the approach detection means detected approach at said home of said vehicles, and being constituted.

[0077]In the device according to claim 25, since a controlled object attached to the home side is controlled by a stage in which former vehicles approached a home rather than vehicles arrive at a home, if it is in a controlled object by the side of a home, it becomes possible to perform a priori operation of contents with which arrival of vehicles was equipped.

[0078]According to the device according to claim 25, a room temperature can be made into optimal temperature by arrival time to a home of vehicles by foreseeing that vehicles arrive at a home and for example, making it start from arrival beforehand about an indoor air-conditioner of a home before. And it is this effect's not being restricted to an air-conditioner, being applied about a general controlled object which has a time lag by purpose achievement, making it precede with arrival of vehicles, and controlling operation of a controlled object beforehand, It can change into the state where the purpose of the controlled object concerned was attained in an arrival time point of actual vehicles.

[0079]In the device according to claim 25, it is possible for surveillance of approach at a home of vehicles to adopt various means. For example, if it is in vehicles equipped with radio transmitters, and field intensity of a radio wave sent from vehicles is measured to the home side, a rough distance of even vehicles can be known. Thus, the invention according to claim 25 is enough to attain the purpose of the invention concerned once if it is roughly detectable that vehicles approached a home, Although detection of a strict distance whether it is [ 570-m ] whether distance of vehicles and a home is 550 m does not eliminate this, it is not necessarily required.

[0080]The home automation device according to claim 26 is characterized by said approach detection means comprising a vehicle station detecting means carried in said vehicles in the home automation device according to claim 25.

[0081]In the device according to claim 26, a vehicle station detecting means carried in vehicles is made to perform. As a vehicle station detecting means, the existing car-navigation system carrying GPS or a gyroscope can be diverted here. In the industry more specifically provided with a vehicle position detection system which can grasp a current position of each vehicles in real time in a control center as a home like a bus or a taxicab industry. Such an existing system is diverted and it becomes possible to call a priori a driver who succeeds the vehicles and operates, and to make him stand by supposing homecoming time of a specific vehicle etc. When applying a method of this claim to a private vehicle of individual possession, it is good to

equip vehicles with a means of communication which notifies a vehicle position detected by a vehicle station detecting means to the home side.

[0082]Since a vehicle station detecting means detects a current position of vehicles according to the device according to claim 26, it can be grasped correctly to which distance vehicles approached a home. As mentioned above, in an invention of a 25 or less-claim statement, strict range measurement how many meters or how many kilometers distance of vehicles and a home is cannot be carried out, but \*\* can also attain the purpose of an invention once. However, the same effect as an invention of claim 25 can be acquired in low cost, without adding special equipment, if this is diverted when a vehicle station detecting means is already carried in vehicles.

[0083]Although it is applied about all the inventions of claims 18 thru/or 32, a device which notifies a current position to the home side directly from the vehicles side in these inventions is not indispensable. For example, it is because it can communicate with vehicles directly and a current position of vehicles can be grasped as there being nothing by accessing the center side periodically from the home side, if it uses "it being where service (registered trademark) now". [ which a certain PHS company provides ]

[0084]However, the home automation device according to claim 27, In the home automation device according to claim 25 or 26, when said approach detection means detects approach at said home of said vehicles, it is characterized by equipping said vehicles with a means of communication for notifying that to said home side.

[0085]In the device according to claim 27, public networks, such as a cellular phone and PHS, may be used as a means of communication, and business-use simplicity radio etc. may be adopted. When infrastructure of an Internet system always connectable cheaply in a future etc. is improved, it may communicate using the system.

[0086]According to the device according to claim 27, an effect fully indicated to 25 or less claim at a realistic price by low cost under state of the art at the time of this application application can be attained by adopting public networks which have spread especially as a means of communication today, such as a cellular phone and PHS.

[0087]The home automation device according to claim 28, In a home automation device of claim 25 thru/or 27 given in any 1 paragraph, Said approach detection means equips the approach detection means with a distance setting-out means for a user to set up a desired distance, and detection of approach at said home of said vehicles by said approach detection means, It is characterized by being carried out, when it has a radius of said set-up distance and said vehicles approach even into a predetermined region of centering on said home approximate circle type.

[0088]In the device according to claim 28, when vehicles invaded into a range within a predetermined distance (for example, 2 km) from a home, it detected that vehicles approached

a home. And it can be set up arbitrarily whether only how much time is preceded from the actual arrival time, and control of a controlled object is made to start by a user enabling it to set up this distance. If time length to precede is given like wanting 15 quotas to start control of a controlled object from arrival, distance which should be roughly set up with an experience value will be able to be known. Even if time length to precede is the same, when a home is located in the center of Tokyo in a chronic congested state, set distance is shortened, and when there is a home in a suburb, what sets up for a long time may be needed. Combining a providing system (VICS) etc. of congestion information which is spreading now, during traffic congestion, it may constitute shortening set distance etc. so that set distance may be dynamically changed according to a degree of traffic congestion. Since time length which is demanded with character of a controlled object and which should be preceded differs, it may enable it to set up a different distance for every controlled object.

[0089]According to the device according to claim 28, since the user can set up whether a desired distance is only inputted, only how much time is preceded from the actual arrival time, and control of a controlled object is made to start, his setting operation is very simple. If a user who runs the same road as the time every day almost same especially for commutation etc., and goes home has, Since it requires that the back starts till arrival as it is experientially sudden if even how many kilometers or what 100 m are approached from a home, it is simple and realistic to set up time length substantially preceded with arrival by the input of distance. The setting out of distance can extend an application range further, if setting out of plurality is enabled for every controlled object.

[0090]Although it is directly [ claim 28 ] unrelated, in vehicles carrying a car-navigation system provided with a function which can compute estimated time of arrival, this function is effectively utilized by giving a current position and an objective position of vehicles, Time length precede before arrival for 30 minutes and make control of a controlled object start and which is directly preceded with how can also be inputted.

[0091]On the other hand, the home automation device according to claim 29, In the home automation device according to claim 26 or 27, said vehicle station detecting means, On a map which it had a displaying means and was displayed on the displaying means, a user has an area setting means which can set up arbitrary fields, Detection of approach at said home of said vehicles by said approach detection means is characterized by being carried out when said vehicles approach even into said set-up predetermined region.

[0092]When vehicles carrying a car navigation device were assumed, fields arbitrary on a display screen of this device were set up and it invaded in the field, it was made to consider that vehicles approached a home in the device according to claim 29.

[0093]Since a field judged to be approach of vehicles can be set up in detail according to the device according to claim 29, an application range can be extended further. For example,

when going home at a home and roads via which it goes by the day running a local street and returning [ run a highway, return, or ] differ. If it is made to set it as short distance from a home about a field including a running path of a local street while setting it as a long distance from a home about a field including a highway, Without asking any running paths are, only the same time can be preceded and control of a controlled object can be made to start rather than arrival substantially now. When there is a supermarket at which it drops in frequently in the middle of going home, what prevents it from a controlled object preceding in time more than needed, and being controlled by setting up a field not include the supermarket in shopping in consideration of taking time can be performed.

[0094]The home automation device according to claim 30 is characterized by control of a controlled object attached to said home side being control of operation of a cooler machine of said home, and/or a space heating appliance in a home automation device of claim 25 thru/or 29 given in any 1 paragraph.

[0095]In the device according to claim 30, we decided to make air-conditioning equipment of a home of a going-home place into a controlled object. If it is in summer or a winter season, although it gets hot according to outside air temperature or gets cold, if room temperature of a home (it does not limit to an ordinary home) made air-conditioning equipment one after a driver went home, during absence, it will need the appropriate time required, by the time the interior of a room reaches comfort temperature.

[0096]Since air-conditioning equipment of a home is controlled by a stage in which vehicles approached a home before time when vehicles arrive at a home according to the device according to claim 30, when a driver goes home, a room temperature of a home can be changed into a comfortable state.

[0097]On the other hand, the home automation device according to claim 31 is characterized by control of a controlled object attached to said home side being control of operation of autobus of said home in a home automation device of claim 25 thru/or 29 given in any 1 paragraph.

[0098]In the device according to claim 31, we decided to make a bath (autobus) of a home of a going-home place into a controlled object. When a driver goes home by this, it becomes possible to change into the state where a bath is automatically ready.

[0099]Since according to the device according to claim 31 it will be ready for the ability to take a bath in a bath immediately when a driver goes home at a home, a living environment convenient especially for an unmarried person can be provided.

[0100]The home automation device according to claim 32, In a home automation device of claim 25 thru/or 29 given in any 1 paragraph, Said home is a cargo facility for the purpose of transportation thru/or delivery of cargo, and said vehicles are characterized by control of a controlled object attached to said home side being control of operation of a device which



prepares beforehand cargo loaded to said vehicles in said cargo facility.

[0101]In the device according to claim 32, we decided to make into a controlled object a device which prepares beforehand cargo loaded to vehicles in a cargo facility as a home supposing vehicles for transportation of cargo thru/or delivery.

[0102]According to the device according to claim 32, like a department store, merchandise delivery of a mail order, and the door-to-door delivery industry, In the industry loads cargo for [ whenever it arrives at a cargo facility ] delivery into vehicles, finishes loading, departs from a cargo facility immediately gradually, and it runs to the next destination, Before time when vehicles arrive at a cargo facility, in a stage in which vehicles approached a cargo facility. Since preparation of the following cargo which should be loaded into vehicles which arrive by the cargo facility side can be made, time which loading of cargo takes as much as possible can be shortened, and operational efficiency of vehicles can be raised. Therefore, it also becomes [ not only according to needs that shortening of transport time like next-day delivery and delivery time specification which are generalized in recent years is required, but ] realizable by raising operational efficiency of vehicles to reduce the total number of required vehicles.

[0103]

[Embodiment of the Invention]Hereafter, the embodiment of the home automation method which starts this invention with reference to an accompanying drawing, and its device is described. In explanation of a drawing, identical codes are given to the same element, and the duplicate explanation is omitted.

[0104](Embodiment 1) Embodiment 1 of this invention is described first. Drawing 1 is a mimetic diagram showing the composition of a home automation device. This embodiment corresponds to claims 1, 2, 3, 7, 8, 9, 10, 11, 14, and 15.

[0105]In the figure, the car barn 13 in which the vehicles 11 are accommodated is attached to the home H which is a common house for dwellings. The attachment said by the claim of this invention expresses the concept established adjunctively. In the inside of the car barn 13, the vehicle detection device 17 which functions as a vehicle detecting means which detects the existence of the existence of the vehicles 11, for example, consists of an ultrasonic sensor, an infrared sensor, or an imaging camera is installed in the approximately center of a ceiling part. The antenna 19 for receiving the radio wave signal sent to the method of the back of the car barn 13 from the transmitter (henceforth a "keyless transmitter") 15 of the keyless entry device attached to the vehicles 11, The sending-signal sensing device 21 and \*\* which function as a sending-signal detection means to process the received signal are arranged.

[0106]Inside the home H, the home server 23 which functions as a control means which is a host computer of a home automation system is allocated, the input signal from the vehicle detection device 17 is received, and the existence of the vehicles 11 in the car barn 13 can be judged now. If the sending-signal sensing device 21 is also connected to the home server 23

again, the keyless transmitter 15 is operated and a door-lock signal is transmitted, it can be compared whether it is in agreement with predetermined self-vehicle ID memorized in response.

[0107]Furthermore, the home server 23 is connected also with the door lock control device 25, It can order so that the front door lock 27 may be unlocked or locked, or it can be detected whether the present door lock 27 is in an unlocked state, and whether it is in a locked state, or it can be detected now whether the front door is opened or it is closed.

[0108]It is connected also to the electrical-household-appliances-and-electrical-equipment control device 29, for example, the home server 23 can supervise the working state of various kinds of electrical household appliances and electrical equipment 31, such as a porch light, an indoor light, a light of a car barn, indoor air-conditioning equipment, autobus, and a bathroom heater, and can control those operations.

[0109]Next, operation of the home automation device concerning Embodiment 1 which consists of the above-mentioned composition is explained. Drawing 2 is a flow chart figure showing a part of operation of the program which the home server 23 in Embodiment 1 is executing.

[0110]Now, the vehicles 11 shall go out and it shall be detected by the vehicle detection device 17 that the inside of the car barn 13 is a vacant taxi. In this state, the home server 23 always supervises the signal from the vehicle detection device 17, and it is awaiting that the vehicles 11 return in the car barn 13.

[0111]If the vehicles 11 return and vehicle warehousing is carried out into the car barn 13 here, this will be detected with the vehicle detection device 17 (Step S10), The home server 23 starts the surveillance of the input signal from the sending-signal sensing device 21, and it waits to transmit a door-lock signal from the keyless transmitter 15 (Step S11).

[0112]Next, the home server 23 sets up the timer constituted by software in 3 minutes, and starts subtraction operation of a timer (Step S12). And waiting to supervise the input signal from the sending-signal sensing device 21, and to receive a door-lock signal is continued until the time check of a timer results in the deadline which becomes zero (progress during 3 minutes) (Step S13) (Step S14). When the vehicles 11 get off and a user pushes the door-lock switch of the keyless transmitter 15 before deadline, When the home server 23 compares predetermined self-vehicle ID remembered to be ID of the electric wave received with the sending-signal sensing device 21 (Step S15) and ID is not in agreement, it returns to Step S13, and if it judges that it is self-vehicle ID, it will progress to the following step 17 (Step S16).

[0113]In Step S17, the home server 23 sends out an unlocking command signal to the door lock control device 25, and the front door lock 27 is unlocked. The voice message of "having opened the key of \*\*\*\*\*" flows from the loudspeaker (not shown) in the car barn 13

simultaneously with this. next, the home server 23 -- a time check -- the timer constituted by software as a means is set up in 1 minute, and subtraction operation of a timer is started (Step S18). And if the door lock control device 25 detects that the front door was opened to within a time [ this ], will complete operation now, but (Step S19). Waiting to report that the front door was opened is continued until it detects that the front door was opened, and it continues subtraction operation of a timer and a time check results in deadline of zero (progress during 1 minute) (Step S20) (Step S19). And if the deadline of is passed, without receiving the notice of the purport that the front door was opened (Step S20), a locking command signal will be sent out to the door lock control device 25, and the front door lock 27 will be locked (Step S21).

[0114]If the user who awaited that the vehicles 11 returned to the home H, and put the vehicles 11 into the car barn 13 does lock operation of the door of the vehicles 11 using the keyless transmitter 15 as mentioned above according to this Embodiment 1, It comes to put in a home, without unlocking the front door lock 27 automatically and using the key of a home. Since it returns to a locked state again when not opening a front door into predetermined time even if it is a case where the front door lock 27 is once unlocked automatically, it is thoroughgoing also from a viewpoint on crime prevention.

[0115]If (Embodiment 2), next example of another of this invention are explained about drawing 3, in the point of not having the vehicle detection device 17, the car barns 13 of this Embodiment 2 differ in Embodiment 1. Since other composition is the same as that of drawing 1, the duplicate explanation is omitted. He is trying only for the sending signal from the keyless transmitter 15 to detect the return to the home H of the vehicles 11 in this Embodiment 2 instead of omitting the vehicle detection device 17. This Embodiment 2 corresponds to claims 1, 4, 5, 6, 7, 8, 9, 12, 13, 14, and 15.

[0116]Next, operation of the home automation device concerning Embodiment 2 which consists of the above-mentioned composition is explained. Drawing 4 is a flow chart figure showing a part of operation of the program which the home server 23 in Embodiment 2 is executing.

[0117]Now, the vehicles 11 are going out and the inside of the car barn 13 presupposes that it is a vacant taxi. In this state, the home server 23 always supervises the input signal from the sending-signal sensing device 21, and it is awaiting that the sending-signal sensing device 21 receives the signal from the keyless transmitter 15.

[0118]Here, even if the vehicles 11 return and it is put in in the car barn 13, at this embodiment, the return of the vehicles 11 is not detected in this stage. When the vehicles 11 get off, and a user (driver) pushes the door-lock switch of the keyless transmitter 15 and locks the door of the vehicles 11 (Step S30), according to the flow chart shown in drawing 4, operation of the home server 23 begins for the first time.

[0119]If the sending signal from the keyless transmitter 15 is received, the home server 23,

Analyze ID contained in the reception radio wave, and it is compared with memorized self-vehicle ID (Step S31), If it judges that ID is in agreement while returning to waiting operation again, when ID is inharmonious (Step S32), it will prepare for supervising the input from the sending-signal sensing device 21 again, and the 2nd door-lock command being received (Step S33).

[0120]Next, the home server 23 sets the timer constituted by software as 5 seconds, and starts subtraction operation of a timer (Step S34). And waiting to supervise the input signal from the sending-signal sensing device 21, and to receive the 2nd door-lock signal is continued until the time check of a timer results in the deadline which becomes zero (5 second passage) (Step S35) (Step S36). When a user pushes the door-lock switch of the keyless transmitter 15 within 5 seconds again following last time, (Step S36), When the home server 23 compares predetermined self-vehicle ID remembered to be ID of the electric wave received with the sending-signal sensing device 21 (Step S37) and ID is not in agreement, it returns to Step S35, and if it judges that it is self-vehicle ID, it will progress to the following step 39 (Step S38).

[0121]Next operation is the same as that of Embodiment 1, and progresses to the unlock operation of the front door lock 27. That is, in Step S39, the home server 23 sends out an unlocking command signal to the door lock control device 25, and the front door lock 27 is unlocked. The voice message of "having opened the key of \*\*\*\*\*" flows from the loudspeaker in the car barn 13 simultaneously with this. next, the home server 23 -- a time check -- the timer constituted by software as a means is set up in 1 minute, and subtraction operation of a timer is started (Step S40). And if the door lock control device 25 detects that the front door was opened to within a time [ this ], will complete operation now, but (Step S41). Waiting to report that the front door was opened is continued until it detects that the front door was opened, and it continues subtraction operation of a timer and a time check results in deadline of zero (1-minute progress) (Step S42) (Step S41). And if the deadline of is passed, without receiving the notice of the purport that the front door was opened (Step S42), a locking command signal will be sent out to the door lock control device 25, and the front door lock 27 will be locked (Step S43).

[0122]When sending out of the 2nd door-lock signal is not performed by deadline of a timer after the 1st door-lock signal was received, It jumps from Step S35 to Step S44, the input surveillance of the sending-signal sensing device 21 which was being performed that the 2nd door-lock command should be received is canceled (Step S44), and it returns to the original waiting operation again.

[0123]According to this embodiment, it awaits that the vehicles 11 return to the home H as mentioned above, If the door-lock switch of the keyless transmitter 15 is pushed, and the user who put the vehicles 11 into the car barn 13 locks the door of the vehicles 11 and pushes a

door-lock switch again continuously immediately, it will come to put in a home, without unlocking the front door lock 27 automatically and using the key of a home. Since it returns to a locked state again when not opening a front door into predetermined time even if it is a case where the front door lock 27 is once unlocked automatically, it is thoroughgoing also from a viewpoint on crime prevention.

[0124]Although this invention is not limited to the above-mentioned embodiment and it was made to perform only unlocking control of the door lock of the door in the above-mentioned embodiment, the following can also become a controlled object, for example.

[0125]If it is when a home is a house of a general residence, various kinds of electrical household appliances and electrical equipment 31, such as a porch light, an indoor light, a light of a car barn, indoor air-conditioning equipment, autobus, a bathroom heater, and cooking appliances, can serve as a controlled object attached to the home. In this case, the user can register into the home server 23 beforehand what kind of operation is made to perform to each electrical household appliances and electrical equipment 31 automatically, when he goes home by the vehicles 11. These contents of registration register various variations according to a user's schedule on the day, a season, etc., and when leaving, they should just choose the contents performed automatically at the time of going home. For example, in going out for skiing on the holiday of winter. . As contents performed after going home, switch on autobus so that it may put into a bath immediately, and switch on a bathroom heater. If it registers with the home server 23 before leaving a series of operations of switching on an electric pot in order to boil water which sets heating of an indoor air-conditioner as strength and which drinks coffee, it will become possible to enjoy comfortable home automation service at the time of going home.

[0126]While making one automatically the power supply of the personal computer of its own desk, accessing the Internet automatically and receiving an E-mail when their own vehicles 11 return if homes are offices, such as a place of work, The information on going-back-to-the-office time can be inputted automatically into the schedule management software which printed the contents automatically to the printer, or was built in the personal computer, and updating a calendar automatically etc. can be realized.

[0127]When a home is a distribution center and the vehicles 11 are delivery vans, the return of the vehicles 11, simultaneously the automatically carry robot of a distribution center are called, and while the cargo which was not able to be delivered since he was absent is taken out and storing in an automatic warehouse, operation of loading automatically into a track the load in which delivery is called for by the next start can also be performed.

[0128](Embodiment 3), next the embodiment corresponding to claims 18 thru/or 32 of this invention are described with reference to drawing 5.

[0129]The approach detection means (vehicle station detecting means) 41 which it comes to

constitute by the car navigation device which equipped the vehicles 11 with the GPS system, the map data base, and the display screen in a figure is carried, The position of a self-vehicle is always supervised, it judges whether it was invaded in the field concerned whether the vehicles 11 would be out of the predetermined region which the user set up beforehand, and this result is transmitted to the control device 43 which contained CPU. The communication apparatus 45 which consists of a car telephone thru/or a cellular phone, etc. is connected to the control device 43, and it is constituted so that data communications may be performed according to control of the control device 43, telephoning the home H.

[0130]The home server 47 as a control means is formed in the home H, and two or more controlled objects 49 by which motion control is carried out according to approach at the home H of the vehicles 11 are connected to this home server 47. In this embodiment, as the controlled object 49, it is the air-conditioning equipment furnished to the home H, autobus and an electric pot, and the refrigerator provided with two or more compartments, and the temperature of the compartment of 1 is connected to defrosting temperature in the switchable thing from freezing temperature. In other embodiments, the home H is a cargo facility and the controlled object 49 is automatically carry equipment of cargo. The modem 51 is connected to the home server 47, it is connected to the general telephone line, this receives automatically the arrival from the communication apparatus 45 of the vehicles 11, and data communications are performed between the control devices 43 of the vehicles 11.

[0131]Next, operation of the program which the control device 43 of the vehicles 11 executes is explained with reference to the flow chart of drawing 6.

[0132]Now, the user shall go home from the place where one has gone to the home H. Starting of the engine of the vehicles 11 will make the display which asks a user whether the predetermined region (area range) for judging approach detection is reset on the display screen of the approach detection means 41 (car navigation device) (Step S51). (Step S50) If it chooses the contents registered into last time will be used as it is, and "will carry out a re set", if it chooses "a re set not being carried out" here, a screen display can change to a resetting menu screen (Step S52), and can choose the setting method of a predetermined region from the three modes.

[0133]That is, the distance from the home H is inputted in the mode 1, and the field of an approximate circle form centering on the home H is registered as a predetermined region thru/or setting area, and when it goes into this field, it comes to be judged with "Vehicles approached the home." Next, the predetermined region of arbitrary shape can be registered as setting area by operating cursor on the map display screen of car navigation in the mode 2. The mode 3 uses the estimated-time-of-arrival calculation function of car navigation, and a user does the direct entry of the time like "30 Quota" of estimated time of arrival. In this case, current time will be judged as "Vehicles approached the home" with having become "30 Quota"

from the estimated time of arrival which the approach detection means 41 which consists of car navigation devices outputs. When these setting out can be set up individually every controlled object 49, for example, it approaches from the home H to 10 km, and setting out of making autobus one at 20 quotas of the estimated time of arrival to the home H can be performed. [ an air-conditioner ]

[0134]After setting out of setting area (predetermined region) is completed, the control device 43 enters the loop which repeats Step S53 and Step S54. At Step S53, it cooperates with the approach detection means 41 which is a car navigation device, the current position of the vehicles 11 is grasped, and it is judged in Step S54 whether it is "vehicles approached the home" according to the contents of registration in the modes 1-3 mentioned above. And if judged with "Vehicles approached the home" at Step S54, It transmits the control commands of the purport that the controlled object of electrical household appliances and electrical equipment etc. is controlled to the home server 47, the control device 43 controlling the means of communication 45 which consists of cellular phones, and telephoning the home H (Step S55), and finishes the operation by the side of the vehicles 11. When a control starting condition different two or more controlled objects 49 of every is set up, this operation is repeated until it jumps to the loop of Step S53 and Step S54 again and the control about all the controlled objects 49 is completed.

[0135]Next, it explains, referring to the flow chart of drawing 7 for operation of the program which the home server 47 as a control means executes to the home H side.

[0136]This will be received via the modem 51 (Step S60), and the home server 47 will start control of corresponding electrical household appliances and electrical equipment, if the control commands of the controlled object 49 are sent from the vehicles 11 at Step S55 mentioned above (Step S61).

[0137]Next, the controlling timer constituted by software is initialized, for example to predetermined time length like 3 hours (Step S62), and the countdown is started. This 1st timer is a safety means in preparation for a case after making one the controlled object 49 (for example, autobus), even if it passes to when, so that a user may not go home, After starting control of the controlled object 49, when a user does not go home within predetermined time, it jumps from Step S63 to Step S80 via the terminal A, and control of the controlled object 49 is turned OFF compulsorily. Even if it faces by this in case of emergency by which the user was involved in the traffic accident in the middle of going home, for example, the situation neglected as electrical household appliances and electrical equipment, such as a bath of the home H and an air-conditioner, were turned on can be prevented. For such a purpose, initial setting of the set period of this 1st controlling timer is carried out to comparatively long time.

[0138]Thus, operation of the home server 47 repeats Step S63 - Step S65, without jumping from Step S63 to Step S80, since it is assumed that the 1st controlling timer does not usually

pass the deadline of. If a user goes home and the going-home key of the home server 47 is pressed, after displaying the control history about each controlled object 49, and the present operating state on the monitor (not shown) of the home server 47, it will end (Step S66).

[0139]It is judged whether Step S64 can be called auxiliary safety means, the current position of the vehicles 11 is acquired from the home server 47 side, and the "approach state" which invaded in setting area is maintained. The purpose of this step is to stop the control of the controlled object 49 started once about a case as carried out by passing through setting area and going away out of that range, without going home as it is, although once approached even near the home H. And when the vehicles 11 and the home server 47 are always connected by simplicity radio, the Internet, etc., for example, execution of Step S64 is performed for every repetition of a loop each time, as shown in a flow chart, but. since he is trying to acquire a current position from the vehicles 11 at this embodiment by telephoning the cellular phone (communication apparatus) 45 of the vehicles 11 via the modem 51 from the home server 47 -- telex rate gold -- it should save -- for example, for 5 minutes -- 1 time -- the intermittent execution to say is made.

[0140]If the judgment of the purport that the vehicles 11 went away out of setting area, and went by Step S64 is made, the 2nd controlling timer constituted by software will be initialized, for example to predetermined time length like [ for 10 minutes ] (Step S70), and the countdown will be started. After detecting that the vehicles 11 separated from the predetermined region, within predetermined time And the (step S71), In not returning to the "approach state" which invaded in the predetermined region again, it turns OFF compulsorily control of (Step S71) and the controlled object 49 after progress of (Step S72) and the predetermined time concerned (Step S73). When it returns to an "approach state" again in predetermined time, it returns to the usual operation via the terminal C from Step S72 (Step S63 - Step S65). Since Step S70 - Step S73 aim at stopping control of the controlled object 49 which has once started control at an as much as possible early stage on the occasion of a case so that it may not go home only by a user merely passing through setting area, Initial setting of the set period of the 2nd controlling timer is carried out comparatively for a short time.

[0141]According to this embodiment, the vehicles 11 before the vehicles 11 arrive at the home H in the stage close to the home H as mentioned above. Since control of the controlled object 49 attached to the home H side is started, about the indoor air-conditioner of the home H, from arrival, for example the vehicles 11 can foresee arriving at the home H, can start them beforehand before, and for this reason. When a user arrives to the home H actually, a room temperature can already be maintained to optimal temperature. Even if it is in controlled objects 49 other than an air-conditioner, about a general controlled object which generally has a time lag by purpose achievement. It can change into the state where the purpose of the controlled object 49 concerned was attained in the arrival time point of the actual vehicles 11



by controlling operation of the controlled object 49 beforehand in advance of arrival of the vehicles 11.

[0142]In the case where a user does not go home within predetermined time as a characteristic effect of this embodiment after starting control of a controlled object, Since the control means was equipped with the controlling timer which turns OFF control of a controlled object compulsorily after progress of the predetermined time concerned, having once made the controlled object (for example, autobus) one -- and even if it waits till when, when a user does not go home, even if it is, the situation which is neglected while the controlled object of the autobus of a home, an air-conditioner, etc. had been turned on can be prevented beforehand.

[0143]In the case where it does not return to the "state where it approached" which invaded in the predetermined region again within predetermined time after detecting that vehicles separated from the predetermined region in this embodiment, Since the control means was equipped with the 2nd controlling timer that turns OFF control of a controlled object compulsorily after progress of the predetermined time concerned, When not going home only by a user merely passing through the inside of a predetermined region, even if it faces, control of the controlled object which has once started control can be stopped comparatively at an early stage.

[0144]Finally, the embodiment described above was indicated in order to make an understanding of this invention easy, and it was not indicated in order to limit this invention. Therefore, each element indicated by the above-mentioned embodiment is the meaning also containing all the design variations belonging to the technical scope of this invention, and equivalents.

[0145]

[Effect of the Invention]According to the home automation method of this invention, and its device, the following effects are acquired as explained to details above.

[0146]When according to the method according to claim 1 the return of the vehicles to a home is supervised and it is detected as a result of this surveillance that vehicles returned to the home, The home automation method based on a new idea of executing by proxy finite operation which the user will take automatically, and performing it and that convenience is very high can be provided.

[0147]According to the method according to claim 2, the return of vehicles can be detected very easily by whether vehicles are in the car barn only for the self-vehicle attached to the home, or there is nothing. And if it is a car barn only for a self-vehicle, there will also be no possibility of wrong detection.

[0148]Since according to the method according to claim 3 a subsequent control action is not started with vehicles having only entered in the car barn but the sending signal of a keyless entry device is detected as a step of a check, generating of malfunction can be prevented

certainly. And the user should just do door-lock operation usually performed at the time of alighting.

[0149]Since attestation that the ID code is contained in the sending signal from the keyless entry device of vehicles, and it is a self-vehicle is ensured according to the method according to claim 4, even if it carries out only with detection of this signal, detection of a return of a self-vehicle can be ensured. And only the door-lock operation inevitably performed at the time of alighting is required of a user.

[0150]The place which according to the method according to claim 5 a user operates a keyless entry device at the time of alighting, for example, pushes a door-lock switch twice in succession [ place ], Since operation of pushing a door-lock switch twice in succession is not usually performed, it had this peculiarity, and mere door-lock operation was not performed, but it can be reported clearly that vehicles returned to the home.

[0151]According to the method according to claim 6, when the return of vehicles is certainly detected by a method given in any 1 paragraph claim 4 or among 5, control of the controlled object by the side of a home can be started.

[0152]According to the method according to claim 7, the door lock of the door assumed to be the most typical fixed form operation after the return to the home of vehicles can be unlocked automatically.

[0153]Even when you have gone out as it is according to the method according to claim 8, without a user's doing vehicle warehousing of the car and going into a home after the return of vehicles, it does not become [ open / continue / the door lock of the door ]. Even if it is a case where the door lock of the door has been automatically unlocked by wrong detection, it should return to a locked state automatically after predetermined time. Therefore, it is thoroughgoing also from a viewpoint on crime prevention.

[0154]According to the device according to claim 9, the return of the vehicles to a home is supervised, and when it is detected as a result of this surveillance that vehicles returned to the home, finite operation which the user will take can be executed by proxy automatically, and can be performed. And such home automation operation, The home automation system with very high flexibility independent of the type of a car and composition of vehicles can be built as a result whose realization is attained only by carrying out additional maintenance of the composition by the side of a home newly, without also giving any change, maintaining the composition by the side of vehicles in the conventional state.

[0155]According to the device according to claim 10, since the return of vehicles can be detected very easily by whether vehicles are in the car barn only for the self-vehicle attached to the home, or there is nothing, as much as possible composition becomes easy. If it is a car barn only for a self-vehicle, there will also be no possibility of the wrong detection by other vehicles.

[0156]Since according to the device according to claim 11 a subsequent control action is not started with vehicles having only entered in the car barn but the sending signal (door-lock signal) of a keyless entry device is detected as a step of a check so to speak, generating of malfunction can be prevented certainly. And the user should just do door-lock operation usually performed at the time of alighting.

[0157]Since attestation that the ID code is contained in the sending signal from the keyless entry device of vehicles, and it is a self-vehicle is ensured according to the device according to claim 12, even if it carries out only with detection of this signal, detection of a return of a self-vehicle can be ensured. And only the door-lock operation inevitably performed at the time of alighting is required of a user.

[0158]In the device according to claim 13, a user operates a keyless entry device at the time of alighting, for example, he pushes a door-lock switch twice in succession [ a user ]. Since operation of pushing a door-lock switch twice in succession is not usually performed, it had this peculiarity, and mere door-lock operation was not performed, but it can be reported clearly that vehicles returned to the home.

[0159]Unlocking of the door lock of the door after a return assumed to be the most typical fixed form operation is controllable by the device according to claim 14.

[0160]Even when you have gone out as it is according to the device according to claim 15, without a user's doing vehicle warehousing of the car and going into a home after the return of vehicles, it does not become [ open / continue / the door lock of the door ]. Even if it is a case where the door lock of the door has been automatically unlocked by wrong detection, it should return to a locked state automatically after predetermined time. Therefore, it is thoroughgoing also from a viewpoint on crime prevention.

[0161]When according to the method according to claim 16 the start of the vehicles from a home is supervised and it is detected as a result of this surveillance that vehicles departed from the home, Since finite operation with a possibility that a user may fail to do is executed by proxy automatically and performed, when the door lock of the door remains unlocking, for example although the start was detected, this can be locked automatically.

[0162]And when the door lock of the door remains unlocking like the method according to claim 16, for example although the start was detected according to the device according to claim 17, Although this can be locked automatically, in addition, such home automation operation, The home automation system with very high flexibility independent of the type of a car and composition of vehicles can be built as a result whose realization is attained only by carrying out additional maintenance of the composition by the side of a home newly, without also giving any change, maintaining the composition by the side of vehicles in the conventional state.

[0163]On the other hand, in the method according to claim 18 to 24, the vehicles before

vehicles arrive at a home are the stages close to a home, and the controlled object attached to the home side can be controlled.

[0164]That is, according to the method according to claim 18, a room temperature can be made into optimal temperature by the arrival time to the home of vehicles by foreseeing that vehicles arrive at a home and for example, making it start from arrival beforehand about the indoor air-conditioner of a home before. And it is this effect's not being restricted to an air-conditioner, being applied about a general controlled object which has a time lag by purpose achievement, making it precede with arrival of vehicles, and controlling operation of a controlled object beforehand, It can change into the state where the purpose of the controlled object concerned was attained in the arrival time point of actual vehicles.

[0165]Since a vehicle station detecting means detects the current position of vehicles according to the method according to claim 19, it can be grasped correctly to which distance vehicles approached the home. In the invention of an 18 or less-claim statement, do not carry out strict range measurement how many meters or how many kilometers the distance of vehicles and a home is, but \*\*, The same effect as the invention according to claim 18 can be acquired in low cost, without adding special equipment, if this is diverted when the vehicle station detecting means is already carried in the vehicles of what can attain the purpose of an invention once.

[0166]Here, since the user can set up whether a desired distance is only inputted, only how much time is preceded from the actual arrival time, and control of a controlled object is made to start, his setting operation is very simple according to the method according to claim 20. If a user who runs the same road as the time every day almost same especially for commutation etc., and goes home has, Since it requires that the back starts till arrival as it is experientially sudden if even how many kilometers or what 100 m are approached from a home, it is simple and realistic to set up the time length substantially preceded with arrival by the input of distance. The setting out of distance can extend an application range further, if setting out of plurality is enabled for every controlled object.

[0167]On the other hand, since the field judged to be approach of vehicles can be set up in detail according to the method according to claim 21, an application range can be extended further. For example, when going home at a home and the roads via which it goes by the day running a local street and returning [ run a highway, return, or ] differ. If it is made to set it as short distance from a home about a field including the running path of a local street while setting it as a long distance from a home about a field including a highway, Without asking any running paths are, only the same time can be preceded and control of a controlled object can be made to start rather than arrival substantially now. When there is a supermarket at which it drops in frequently in the middle of going home, what prevents it from a controlled object preceding in time more than needed, and being controlled by setting up a field not include the

supermarket in shopping in consideration of taking time can be performed.

[0168]Since the air-conditioning equipment of a home is controlled by the stage in which vehicles approached the home before the time when vehicles arrive at a home according to the method according to claim 22, when a driver goes home, the room temperature of a home can be changed into a comfortable state.

[0169]Since it will be ready for the ability to take a bath in a bath immediately on the other hand according to the method according to claim 23 when a driver goes home at a home, a living environment convenient especially for an unmarried person can be provided.

[0170]According to the method according to claim 24, like a department store, the merchandise delivery of a mail order, and the door-to-door delivery industry, In the industry loads the cargo for [ whenever it arrives at a cargo facility ] delivery into vehicles, finishes loading, departs from a cargo facility immediately gradually, and it runs to the next destination, Before the time when vehicles arrive at a cargo facility, in the stage in which vehicles approached the cargo facility. Since preparation of the following cargo which should be loaded into the vehicles which arrive by the cargo facility side can be made, the time which loading of cargo takes as much as possible can be shortened, and the operational efficiency of vehicles can be raised. Therefore, it also becomes [ not only according to the needs that shortening of transport time like the next-day delivery and delivery time specification which are generalized in recent years is required, but ] realizable by raising the operational efficiency of vehicles to reduce the total number of required vehicles.

[0171]In the device according to claim 25 to 32, the vehicles before vehicles arrive at a home are the stages close to a home, and the controlled object attached to the home side can be controlled.

[0172]By namely, the thing which you foresee that vehicles arrive at a home and is made to start from arrival beforehand about the indoor air-conditioner of a home before like [ according to the device according to claim 25 ] the method indicated to claim 18 for example. A room temperature can be made into optimal temperature by the arrival time to the home of vehicles. And it is this effect's not being restricted to an air-conditioner, being applied about a general controlled object which has a time lag by purpose achievement, making it precede with arrival of vehicles, and controlling operation of a controlled object beforehand, It can change into the state where the purpose of the controlled object concerned was attained in the arrival time point of actual vehicles.

[0173]According to the device according to claim 26, like the method indicated to claim 19, since a vehicle station detecting means detects the current position of vehicles, it can be grasped correctly to which distance vehicles approached the home. In the invention of a 25 or less-claim statement, do not carry out strict range measurement how many meters or how many kilometers the distance of vehicles and a home is, but \*\*, The same effect as the

invention of claim 25 can be acquired in low cost, without adding special equipment, if this is diverted when the vehicle station detecting means is already carried in the vehicles of what can attain the purpose of an invention once.

[0174]According to the device according to claim 27, the effect fully indicated to 25 or less claim at the realistic price by low cost under the state of the art at the time of this application application can be attained by adopting public networks which have spread especially as a means of communication today, such as a cellular phone and PHS.

[0175]Here, like the method indicated to claim 20, since the user can set up whether a desired distance is only inputted, only how much time is preceded from the actual arrival time, and control of a controlled object is made to start, his setting operation is very simple according to the device according to claim 28. If a user who runs the same road as the time every day almost same especially for commutation etc., and goes home has, Since it requires that the back starts till arrival as it is experientially sudden if even how many kilometers or what 100 m are approached from a home, it is simple and realistic to set up the time length substantially preceded with arrival by the input of distance. The setting out of distance can extend an application range further, if setting out of plurality is enabled for every controlled object.

[0176]On the other hand, since the field judged to be approach of vehicles can be set up in detail like the method indicated to claim 21 according to the device according to claim 29, an application range can be extended further. For example, when going home at a home and the roads via which it goes by the day running a local street and returning [ run a highway, return, or ] differ. If it is made to set it as short distance from a home about a field including the running path of a local street while setting it as a long distance from a home about a field including a highway, Without asking any running paths are, only the same time can be preceded and control of a controlled object can be made to start rather than arrival substantially now. When there is a supermarket at which it drops in frequently in the middle of going home, what prevents it from a controlled object preceding in time more than needed, and being controlled by setting up a field not include the supermarket in shopping in consideration of taking time can be performed.

[0177]Since vehicles control the air-conditioning equipment of a home by the stage in which vehicles approached the home before the time which arrives at a home like the method indicated to claim 22 according to the device according to claim 30, when a driver goes home, the room temperature of a home can be changed into a comfortable state.

[0178]Since it will be ready for the ability to take a bath in a bath immediately on the other hand like the method indicated to claim 23 according to the device according to claim 31 when a driver goes home at a home, a living environment convenient especially for an unmarried person can be provided.

[0179]Like [ according to the device according to claim 32 ] the method indicated to claim 24,

like a department store, the merchandise delivery of a mail order, and the door-to-door delivery industry, In the industry loads the cargo for [ whenever it arrives at a cargo facility ] delivery into vehicles, finishes loading, departs from a cargo facility immediately gradually, and it runs to the next destination, Before the time when vehicles arrive at a cargo facility, in the stage in which vehicles approached the cargo facility. Since preparation of the following cargo which should be loaded into the vehicles which arrive by the cargo facility side can be made, the time which loading of cargo takes as much as possible can be shortened, and the operational efficiency of vehicles can be raised. Therefore, the extremely outstanding effect that it also becomes realizable reducing the total number of required vehicles is done [ not only according to the needs that shortening of transport time like the next-day delivery and delivery time specification which are generalized in recent years is required, but ] so by raising the operational efficiency of vehicles.

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[Translation done.]